

CONTENTS

Section	Page
ACRONYMS AND ABBREVIATIONS	v
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1
2.0 BACKGROUND AND SUPPORTING INFORMATION	3
2.1 ENVIRONMENTAL SETTING	3
2.2 AIR EMISSIONS INFORMATION.....	5
2.2.1 Sources at TOCDF.....	6
2.2.2 Sources at CAMDS.....	7
2.2.3 Summary of Procedures for Estimating Emission Rates	8
2.3 EMISSION RATES FOR PCDDs, PCDFs, AND PCBs.....	9
2.3.1 Dioxins.....	9
2.3.2 PCBs	11
2.3.3 High Molecular Weight Polycyclic Aromatic Hydrocarbons.....	15
2.4 IDENTIFICATION OF COMPOUNDS OF POTENTIAL CONCERN	15
3.0 EXPOSURE ASSESSMENT	18
3.1 SUMMARY OF PROBLEM FORMULATION.....	18
3.1.1 Exposure Setting.....	18
3.1.2 Food Webs	20
3.1.3 Assessment Endpoints	20
3.1.4 Measures of Exposure.....	24
3.1.4.1 Identification of Exposure Scenario Locations.....	24
3.1.4.2 Measurement Receptors for Soil, Surface Water, and Sediment.....	25
3.1.4.3 Measurement Receptors for Mammal and Bird Feeding Guilds	25
3.2 DETERMINATION OF ESTIMATED EXPOSURE LEVELS	25
3.2.1 Estimated Exposure Levels for Media Communities	26
3.2.2 Estimated Exposure Levels for Mammals and Birds.....	26
4.0 RISK CHARACTERIZATION	28
4.1 ESTIMATION AND DESCRIPTION OF RISK	28
4.1.1 Shrub-Scrub Habitat	29
4.1.2 Clover Pond	29
4.1.3 Rush Lake	31
4.1.4 Risk Isopleths.....	31

CONTENTS (Continued)

Appendix (Continued)

4.2	EVALUATION OF OTHER SOURCES	33
4.3	UNCERTAINTIES	35
4.3.1	Major Uncertainties	35
4.3.1.1	Emission Rates.....	37
4.3.1.2	Exposure Assessment	37
4.3.1.3	Toxicity Assessment.....	38
4.3.2	Uncertainties Associated with Methylmercury Risk Estimates	38
4.3.2.1	Uncertainties Associated with Emission Rates.....	39
4.3.2.2	Uncertainties Associated with Fate and Transport Modeling	39
4.3.2.3	Uncertainties Associated with Toxicity	39
4.3.2.4	Uncertainties Associated with Aquatic Habitat Quality	40
5.0	CONCLUSIONS	41
6.0	REFERENCES	42

Appendix

A	PHOTOGRAPHS
B	EMISSION RATE SPREADSHEETS FOR TOOELC CHEMICAL AGENT DISPOSAL FACILITY AND CHEMICAL AGENT MUNITIONS DISPOSAL SYSTEM
B-1	TOCDF LIQUID INCINERATOR 1 WEIGHTED EMISSION RATES
B-2	TOCDF LIQUID INCINERATOR 2 WEIGHTED EMISSION RATES
B-3	TOCDF METAL PARTS FURNACE WEIGHTED EMISSION RATES
B-4	TOCDF DEACTIVATION FURNACE SYSTEM WEIGHTED EMISSION RATES
B-5	CAMDS METAL PARTS FURNACE MAXIMUM EMISSION RATES
B-6	CAMDS DEACTIVATION FURNACE SYSTEM MAXIMUM EMISSION RATES
B-7	TOCDF BRINE REDUCTION AREA EMISSION RATES
B-8	TOCDF HVAC SYSTEM EMISSION RATES
B-9	CAMDS HVAC SYSTEM EMISSION RATES
C	POLYCHLORINATED BIPHENYL TOXIC EQUIVALENT EMISSION RATES FOR TOOELC CHEMICAL AGENT DISPOSAL FACILITY AND CHEMICAL AGENT MUNITIONS DISPOSAL SYSTEM
C-1	TOCDF DEACTIVATION FURNACE SYSTEM TOTAL PCB EMISSION RATES FOR AGENT CAMPAIGNS
C-2	TOCDF METAL PARTS FURNACE TOTAL PCB EMISSION RATES FOR AGENT CAMPAIGNS
C-3	CAMDS METAL PARTS FURNACE TOTAL PCB EMISSION RATES FOR AGENT CAMPAIGNS

CONTENTS (Continued)

Appendix (Continued)

- C-4 TOCDF DEACTIVATION FURNACE SYSTEM PCB TEQ EMISSION RATES FOR AGENT CAMPAIGNS
- C-5 TOCDF METAL PARTS FURNACE PCB TEQ EMISSION RATES FOR AGENT CAMPAIGNS
- C-6 CAMDS METAL PARTS FURNACE PCB TEQ EMISSION RATES FOR AGENT CAMPAIGNS
- D MS ACCESS DATABASE CONTAINING RISK RESULTS FOR TOCDF PHASE I ECOLOGICAL RISK ASSESSMENT
- E ECORISK OUTPUT FILES CONTAINING PROJECT RUNS FOR TOCDF PHASE I ECOLOGICAL RISK ASSESSMENT
 - E-1 MAIN ECORISK PROJECT OUTPUT FILE
 - E-2 FISH DIOXINS PROJECT OUTPUT FILE
 - E-3 BIRD DIOXINS PROJECT OUTPUT FILE
 - E-4 FISH PCB TEQ PROJECT OUTPUT FILE
 - E-5 MAMMAL PCB TEQ PROJECT OUTPUT FILE
 - E-6 BIRD PCB TEQ PROJECT OUTPUT FILE
 - E-7 TOTAL HPAH PROJECT OUTPUT FILE
- F RISK RESULTS FOR COMPOUNDS WITH ESQs GREATER THAN TARGET LEVEL OF 1.0 FOR ALL SOURCES BY HABITAT

CONTENTS (CONTINUED)

<u>Figure</u>		<u>Page</u>
2-1	SITE LOCATION MAP	4
3-1	HABITAT MAP	19
3-2	SHRUB-SCRUB FOOD WEB	21
3-3	MONTANE FOOD WEB.....	22
3-4	AQUATIC FOOD WEB.....	23
4-1	METHYLMERCURY ESQ ISOPLETHS.....	34

TABLES

<u>Table</u>		<u>Page</u>
2-1	2,3,7,8-TCDD TOXICITY EQUIVALENCY FACTORS FOR PCDDs AND PCDFs.....	10
2-2	SUMMARY OF COMPOUNDS QUANTITATIVELY EVALUATED IN TOCDF PHASE I ERA	12
2-3	2,3,7,8-TCDD TOXICITY EQUIVALENCY FACTORS FOR PCBs	16
4-1	ESQ VALUES FOR SHRUB-SCRUB RECEPTORS EXCEEDING THE DSHW TARGET LEVEL	30
4-2	ESQ VALUES FOR AQUATIC RECEPTORS EXCEEDING THE DSHW TARGET LEVEL	32
4-3	MAJOR UNCERTAINTIES IN TOCDF PHASE I ECOLOGICAL RISK ASSESSMENT	36

ACRONYMS AND ABBREVIATIONS

ACWA	Assembled Chemical Weapons Assessment
BCF	Bioconcentration Factor
BLM	Bureau of Land Management
BRA	Brine reduction area
CAMDS	Chemical Agent Munitions Disposal System
C_{dw}	Concentration of compound dissolved in water
CHB	Container handling building
COPC	Compound of potential concern
C_s	Concentration of compound in soil
C_{sed}	Concentration of compound in sediment
C_{wctot}	Total concentration of compound in water column
DCD	Deseret Chemical Depot
DFS	Deactivation furnace system
DSHW	Division of Solid and Hazardous Waste
EEL	Estimated exposure level
ERA	Ecological risk assessment
ESQ	Ecological screening quotient
FCM	Food chain multiplier
GB	Isopropyl methylphosphonofluoridate (Sarin)
H	Bis(2-chloroethyl) sulfide
HD	Distilled H
HT	Mixture of HD and T
HHRA	Human health risk assessment
HPAH	High molecular weight PAH
HQ	Hazard quotient
HVAC	Heating, ventilation, and air conditioning
IDW	Inverse distance weighted
JACADS	Johnston Atoll Chemical Agent Disposal System
km	Kilometer
LIC	Liquid incinerator
LOAEL	Lowest-observed-adverse-effect-level
MDB	Munitions demilitarization building
mg/kg BW-d	Milligram per kilogram body weight per day
MPF	Metal parts furnace
MRI	Midwest Research Institute, Inc.
NA	Not applicable
NOAEL	No-observed-adverse-effect-level
PAH	Polycyclic aromatic hydrocarbon
PAS	Pollution abatement system
PCB	Polychlorinated biphenyl
PCDD	Polychlorinated dibenzo-p-dioxin
PCDF	Polychlorinated dibenzofuran
PIC	Product of incomplete combustion
PUB	Process utilities building
RCRA	Resource Conservation and Recovery Act
RDX	Cyclotrininitraminemethylene
SLERAP	Screening Level Ecological Risk Assessment Protocol
SVOC	Semivolatile organic compound
T	Bis-2[chloroethylthioethyl]ether

ACRONYMS AND ABBREVIATIONS (Continued)

TCDD	Tetrachlorodibenzo-p-dioxin
TEAD	Tooele Army Depot
TEF	Toxicity equivalency factor
TEQ	Toxic equivalents
Tetra Tech	Tetra Tech EM Inc.
TIC	Tentatively identified compound
TOCDF	Tooele Chemical Agent Disposal Facility
UDEQ	Utah Department of Environmental Quality
U.S. EPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
VX	O-ethyl-S-[2-diisopropylaminoethyl] methylphosphonothiolate
WHO	World Health Organization